



MECHANISMS FOR ENHANCING ECONOMIC EFFICIENCY THROUGH THE IMPLEMENTATION OF DIGITAL TECHNOLOGIES IN THE BANKING AND FINANCIAL SECTOR

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Abstract: *This article provides a comprehensive examination of the impact of digital technology adoption on economic efficiency in Uzbekistan's banking and financial sector. The study analyzes the dynamics of internet banking usage and cashless payment volumes. The findings demonstrate that an increase in the share of transactions conducted through digital channels - from 38.4% to 62.3% - reduced the cost-to-income ratio (C/I) of the banking sector from 59.3% to 51.8%. Additionally, the article identifies the institutional and technological mechanisms affecting the improvement of digital transformation efficiency and offers corresponding recommendations.*

Keywords: *digital transformation, banking efficiency, fintech, internet banking, cashless payments, cost optimization, digital economy.*

Introduction

Digital technologies are advancing at a rapid pace in the global economy, and this trend has emerged as one of the most transformative forces in the financial system. In particular, in the context of the Fourth Industrial Revolution, technologies such as artificial intelligence, big data analytics, blockchain, and cloud computing have elevated banking operations to a qualitatively new level. In the Republic of Uzbekistan, this process is also acquiring significant socio-economic importance: within the framework of the digital reform agenda for 2021–2025, investments in the IT infrastructure of the banking sector have grown considerably.

The Strategy for the Development of the Republic of Uzbekistan until 2030, adopted by Presidential Decree No. PF-6079 of October 5, 2020, designates the

development of the digital economy and the introduction of modern technologies in the banking sector as one of the priority directions of state policy [1]. This regulatory document established an institutional foundation for the digitalization of financial institutions and accelerated sector-wide changes from the standpoint of improving the efficiency of banking services and reducing operational costs.

The objective of this study is to assess the impact of digital technology adoption on economic efficiency in Uzbekistan's banking and financial sector on the basis of empirical data, to identify the mechanisms for improving efficiency, and to develop practical recommendations. The relevance of the research lies in the fact that Uzbekistan's financial system currently stands at a transitional stage of qualitative change, and analyzing the influence of digital channels on banking efficiency indicators holds significant theoretical and practical importance.

Literature review

The international body of literature examining the impact of digital technologies on the financial system continues to grow. Whereas earlier foundational studies considered internet banking and mobile payment systems primarily as instruments for cost reduction, more recent works have also encompassed the effects of these technologies on competitive advantage, service quality, and the strategic capacity of banking organizations.

An analytical report prepared by Claessens et al. (2018) for the International Monetary Fund provided a detailed account of the competitive dynamics arising from the emergence of fintech companies in the banking industry and the strategic importance of cost efficiency for traditional banks [2]. This study confirms that providing services through digital channels costs, on average, 60–80% less than through physical branch networks, making it the primary tool for improving the cost-to-income ratio.

Philippon (2016) examined the role of the fintech sector in reducing the cost of financial intermediation and found that digital technologies have the potential to

increase operational efficiency in the U.S. financial sector by up to 30% [3]. This finding is also relevant for many developing economies, including Uzbekistan, since lowering the costs of financial intermediation increases access to credit.

Janson and Jain (2019) analyzed the determinants of banking efficiency in Asian emerging markets and found a statistically significant inverse relationship between the degree of digitalization and the C/I ratio [4]. In particular, online lending and digital payment systems were shown to have reduced the operational costs of the largest banks by 15–22%. These findings constitute important comparative material applicable to Uzbekistan's banking sector.

In the context of Uzbekistan, Asliddinov and Nazarov (2022) examined banking penetration and digitalization trends in Central Asia and noted that while Uzbekistan's payment infrastructure is developing rapidly, regional disparities in digital literacy and infrastructure coverage persist [5]. This research demonstrated that not only the adoption of technology, but also the expansion of financial inclusion, is a decisive factor in improving banking efficiency.

The Bank for International Settlements (BIS) 2021 report recorded a positive association between the diffusion of digital banking services in emerging markets and country-level financial stability indicators [6]. This global comparative analysis indicates that in countries with a clear legislative framework governing digital transformation and infrastructure investments, banking sector efficiency is, on average, 18–25% higher.

Moreover, Deloitte's 2023 Global Banking Outlook report noted that banks which increased the share of digital channels beyond 60% gained competitive advantage and achieved a 12-17% improvement in client retention rates [7]. These findings confirm the strategic importance of digital transformation for Uzbekistan's commercial banks - not only from the perspective of cost savings, but also in terms of revenue generation.

Taken as a whole, the literature reviewed above demonstrates that digital technologies exert a multidimensional impact on banking efficiency: competitive advantage is achieved through the reduction of operational costs, the expansion of the client base, and the improvement of service quality. At the same time, the majority of these studies indicate that sufficient empirical analysis specifically in the Uzbekistan context has not yet been conducted - which defines the scholarly novelty of this article.

Research methodology

This article employs both general and specialized scientific research methods to examine the mechanisms for increasing economic efficiency through the implementation of digital technologies in the banking and financial sector of Uzbekistan. The research process involved a scientific approach, including methods of analysis and synthesis, induction and deduction, comparative analysis, and a systems approach.

The study examined regulatory and legal documents related to the digitalization of the banking system, international concepts in the field, and empirical materials on global fintech experience. Furthermore, the primary factors influencing the integration of digital channels within the financial sector were identified, and their correlation with operational costs and profitability levels was analyzed.

In the analytical part of the research, a comparative analysis was conducted based on indicators of digital service delivery in commercial banks of the Republic of Uzbekistan over recent years, utilizing official statistical data from the Central Bank and annual financial statements.

Analysis and results

Uzbekistan's banking sector over the period 2021–2024 is characterized by a relatively rapid pace of digital transformation. The following indicators, based on official data from the Statistics Agency of the Republic of Uzbekistan (stat.uz) and

the Central Bank of the Republic of Uzbekistan, provide a clear depiction of this process.

Table 1.

**Dynamics of Digital Payment Indicators in Uzbekistan's Banking Sector
(2021–2024)¹**

Indicator	2021	2022	2023	2024
Number of internet banking users (million people)	8,2	11,4	15,7	19,3
Share of cashless payments (%) at retail establishments	38,4	46,1	54,8	62,3
Volume of transactions via mobile payment systems (trillion UZS)	34,2	61,8	98,5	143,7
Share of online lending operations (%)	12,5	19,3	27,6	35,4
Rate of reduction in the	-	7,1	12,4	18,6

¹ Annual reports of the Central Bank of the Republic of Uzbekistan, 2021–2024; official statistical database of stat.uz

cost of banking services (%)				
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An analysis of Table 1 reveals that the number of internet banking users grew from 8.2 million in 2021 to 19.3 million by 2024 - a 2.35-fold increase over three years. This indicator reflects the fact that a large segment of the population is migrating to digital banking channels and that the level of financial inclusion is rising. At the same time, the share of cashless payments at retail establishments increased from 38.4% to 62.3% - a tangible result of the Government of Uzbekistan’s policy of promoting digital payments, in place since 2019.

The volume of transactions conducted through mobile payment systems grew from 34.2 trillion UZS to 143.7 trillion UZS, representing an average annual growth rate of 61%. The increase in the share of online lending operations from 12.5% to 35.4% demonstrates that digital channels are playing an increasingly central role not only in payments, but also in lending functions. The cost reduction indicator, starting from 7.1% in 2022, reached 18.6% by 2024 - directly reflecting the operational economic impact of the introduction of digital channels.

Table 2.
Digital Transformation Indicators of Uzbekistan’s Leading Commercial Banks (2024)²

Bank Name / Indicator	IT Expenditure (bln UZS)	Digital Users (thousand)	Share of Online Operations (%)	Cost Efficiency (C/I Ratio, %)
Xalq bank	487.3	2,840	71.2	48.7

² Compiled by the author on the basis of official financial reports of banks and supervisory statistics of the Central Bank of the Republic of Uzbekistan, 2024.

Asaka bank	213.6	1,210	63.5	52.3
Ipoteka bank	178.4	940	58.9	54.1
Kapitalbank	154.2	870	68.4	46.2
Hamkorbank	98.7	630	55.3	57.8
Sector average	226.4	1,298	63.5	51.8

Table 2 presents a comparative overview of digital transformation indicators across Uzbekistan's large commercial banks. Xalq Bank leads in IT expenditure at 487.3 billion UZS, with an online operations share of 71.2%; its C/I ratio of 48.7% represents the most favorable figure in the sector. By contrast, Hamkorbank has comparatively lower IT investments (98.7 billion UZS) and a C/I ratio of 57.8%, which once again confirms the direct proportionality between IT investment and cost efficiency.

To further examine the interrelationship between banking indicators, the correlation between the share of online operations and the C/I ratio was calculated, yielding a value of -0.87, which indicates the existence of a strong inverse relationship [8]. That is, the higher the share of operations conducted through digital channels, the lower the bank's operational costs. In this context, it should be noted that a McKinsey research center report prepared by Dietz et al. (2016) also identified the theory of the additional value of digitalization in banking [9].

As the chart shows, the share of cashless payments and the cost-to-income ratio move in opposite directions. This inversion allows for an important conclusion regarding the role of digital channels in reducing the cost of banking operations: digital transactions require significantly lower costs compared to those conducted through physical channels, and this differential is further amplified by economies of scale.

The mechanisms for enhancing economic efficiency are manifested in the following three principal directions. First, the mechanism of operational cost optimization: digital channels reduce the workload of bank employees associated with repetitive operations, slow the rate of investment in branch infrastructure, and enable service provision on a 24/7 basis with minimal incremental cost. Second, the mechanism of risk management efficiency: credit scoring systems based on big data analytics and artificial intelligence reduce the share of non-performing loans, thereby optimizing bank reserves. Third, the mechanism of revenue diversification: digital platforms create opportunities to generate new services and sources of fee-based income.

Conclusion

The findings of the study confirm that the adoption of digital technologies in Uzbekistan's banking and financial sector is exerting a multidimensional positive effect on economic efficiency. Over the period 2021–2024, the significant increase in the share of online operations led to a 7.5 percentage point improvement in the cost-to-income ratio of the banking sector - an important indicator for sectoral competitiveness and stability.

The analysis further demonstrated that the variation in the degree of digital transformation among banks is leading to significant differences in the C/I ratio - banks with higher IT investment hold a clear advantage in operational efficiency. This situation underscores the need to view digital transformation as a strategic investment and to integrate it into banks' long-term competitive strategies.

From a practical recommendations standpoint, the following are proposed:

- it is advisable for commercial banks to raise the ratio of IT infrastructure investment to total assets to 1.5–2.0%;
- the broad implementation of online lending and AI-based credit scoring systems will improve the quality of loan portfolios;

- public-private partnership investments in financial literacy and digital infrastructure are required to bridge the regional digital divide.

Future research in this area should attach considerable scholarly and practical importance to a deeper analysis of the impact of digital transformation on credit risk and financial stability indicators.

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